

Syllabus ...

Chapter 1 : Fundamentals of Computer

[4 Hours, 6 Marks]

- 1.1 Introduction
- 1.2 Type of Computer
- 1.3 Components of PC
- 1.4 Inputs and Output Devices
- 1.5 Computer Languages
- 1.6 Memory of Computer

Chapter 2 : Introduction to MS Office

[8 Hours, 12 Marks]

- 2.1 MS-Word: Introduction, Starting MS-Word Screen and its Components, Elementary Working with MS-Word
- 2.2 MS-Excel: Introduction, Starting MS-Excel, Basics of Spreadsheet, MS-Excel Screen and its Components, Elementary Working with MS-Excel
- 2.3 MS-PowerPoint: Introduction, Starting MS-PowerPoint, Basics of PowerPoint, MS-PowerPoint Screen and its Components, Elementary Working with MS-PowerPoint

Chapter 3 : Introduction to Internet

[4 Hours, 6 Marks]

- 3.1 What is Internet?
- 3.2 Computer Communication and Internet
- 3.3 WWW and Web Browsers
- 3.4 Creating Own Email Account
- 3.5 Networking and Types

Chapter 4 : Introduction to HTML and Software

[8 Hours, 10 Marks]

- 4.1 Introduction to HTML, Working of HTML
- 4.2 Creating and Loading HTML Pages, Tags
- 4.3 Structure of HTML, Document, Stand Alone Tags
- 4.4 Formatting Text, Adding Images, Creating Hyper Links, Tables
- 4.6 Cyber Security
- 4.7 Computer Virus

Chapter 5 : Information Technology

[6 Hours, 6 Marks]

- 6.1 Current IT Tools
 - 6.2 Social Networking, Mobile Computing, Cloud Computing
 - 6.3 Introduction of IOT and IOE
 - 6.4 Computer Application in various fields like Data Analysis, Database Management, Artificial Intelligence
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Fundamentals of Computer

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1.1 INTRODUCTION

- Today's world is an information rich world. In today's world, computers have become an integral part of our lives; computers are being used in every sphere of human activity whether it is at home, at office or at bank.
- Fields such as education, entertainment, medicine, banking, military, weather forecasting and telecommunications have been greatly influenced by the use of computers. This pervading presence of computers has made it necessary for everyone to have a fundamental knowledge of computers.
- A computer is basically a programmable computing machine. Computing is the process of utilizing computer technology to complete a task. Computing machine is a machine for performing particular tasks automatically.

1.1.1 What is Computer/Meaning of Computer

- The term computer is derived from the Latin word "compute" means "to calculate".
- A computer is basically a programmable computing machine that is used to store, retrieve and manipulate data.
- A computer is an electronic device that performs a given task (operation) on the basis of given instructions.

- The word COMPUTER can be analyzed as follows:

C	Calculate
O	Operate
M	Memorize
P	Print
U	Update
T	Tabulate
E	Edit
R	Response

1.1.2 Definition and Working of Computer

Definition of Computer:

- A computer can be defined as, "an electronic device which processes the information supplied (inputs) and produces the desired result (output) according to the given instructions (programs)". **OR**
- A computer can be defined as, "an information processing machine that can perform mathematical and logical manipulations (data processing) in accordance with a pre-defined set of instructions (programs) with capacity to store data temporarily and/or permanently".

Working of the Computer:

- Fig. 1.1 shows work environment of a computer.
- A computer mainly works on the following principle (See Fig. 1.1):
 - Input:** Taking the input in the form of instruction and data.
 - Process:** Processing the instruction and data and store the data.
 - Output:** Display the stored data or output into the print format.

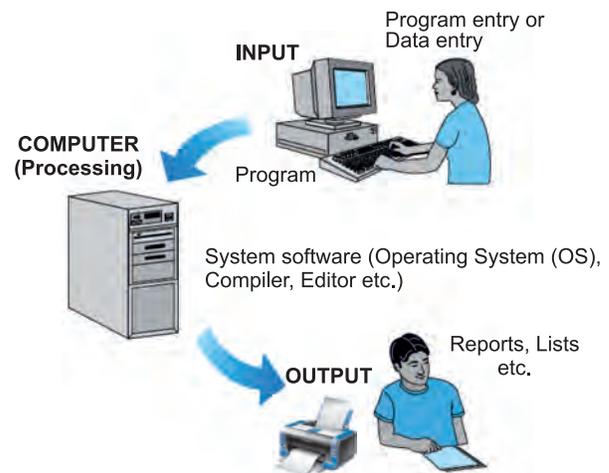


Fig. 1.1: Work Environment of the Computer

1.1.3 Characteristics/Features of Computers

- The main characteristics of the computers, which makes them powerful and useful are listed below:
 - Automation:** An automatic machine works by itself without human intervention. Computers have automation power that means computer can perform the task automatically by using programs.
 - Speed:** Computers are of high speed in its operations. The speed is measured in terms of Instructions Per Second (IPS). All modern computers can process information at a speed of a couple of Million Instructions Per Second (MIPS).
 - Accuracy:** Computers are highly accurate in its operations. They either give correct answer or do not answer at all. Errors can occur in computers but these are mainly due to human rather than technological weakness.
 - Reliability:** It is the ability of the computers to perform the same job exactly in the same way in any numbers of times.
 - Versatility:** A computer is capable of performing almost any task provided that the task can be reduced to a series of logical steps.
 - Integrity:** It is the ability of the computers to carry out a sequence of instructions.
 - No Feelings:** Computers are devoid of emotions. They have no feeling because they are machines.

8. Diligence Continuity: A computer is free from monotony, tiredness, lack of concentration etc. It can work for hours without creating any error.

9. Power of Remembering: Computers can store and use any amount of information because of its storage capability.

1.1.4 Block Diagram of Computer

- Fig. 1.2 shows block diagram of a computer.
- The basic computer structure (block diagram) explains/describes the way in which different units of computer are interconnected with each other. Every computer system has essential four important units i.e., input unit, output unit, CPU and storage unit.
- The basic functional units of a computer in Fig. 1.2 are described below:

1. Input Unit:

- Input is the process of entering data and programs (instructions) in to the computer system with the input device.
- The device that accepts data from the user and communicates the same to the CPU is called as an input device.
- Some common input devices are keyboard, mouse, joystick, light pen, track ball, scanner, graphic tablet, microphone, Magnetic Ink Card Reader (MICR), Optical Character Reader (OCR), Barcode reader, Optical Mark Reader (OMR) etc.
- Functions of input unit are listed below:
 - (i) It accepts or reads data/instructions from outside world.
 - (ii) Input unit converts these data/instructions in computer acceptable form.
 - (iii) Input unit supplies the converted data/instructions to the storage unit for storage and further processing.

2. CPU:

- The Central Processing Unit (CPU) is referred to as "brain" of a computer system. CPU converts data (input) into meaningful information (output).
- The CPU controls all the internal and external devices, performs arithmetic and logic operations, and operates only on binary data (1's and 0's).
- In addition, CPU also controls the usage of main memory to store data and instructions and controls the sequence of operations.
- The CPU consists of three main subsystems, the Arithmetic Logic Unit (ALU), the Control Unit (CU), and the Registers.
- ALU performs the arithmetic and logic operations on the data that is made available to it.
- CU is responsible for organizing the processing of data and instructions. CU also controls and coordinates the activity of the other units of computer.
- CPU uses the registers to store the data, instructions during processing.

3. Memory or Storage Unit:

- The process of saving data and instructions permanently or temporary is known as storage.

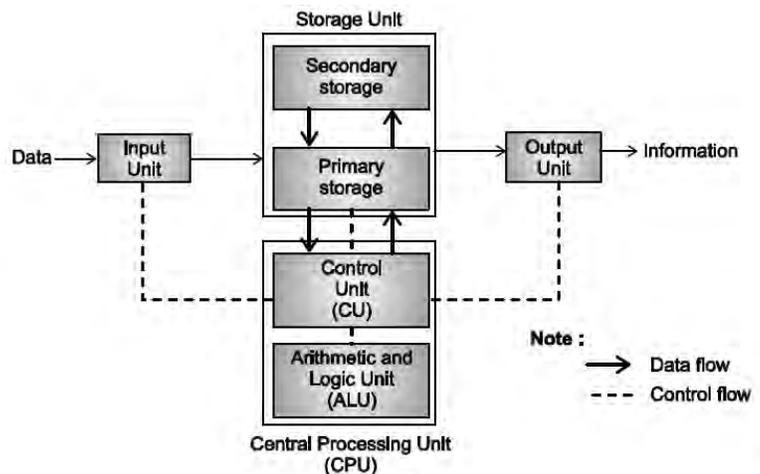


Fig. 1.2: Block Diagram of a Computer

- Memory unit can store instruction, data and intermediate results. This unit supplies information to the other units of the computer when needed.
 - There are two types of memories i.e., **Volatile Memory** (whose contents are erased when the system's power is turned OFF) and **Non-volatile Memory** (whose contents will be saved regardless if the power to the computer is ON or OFF).
 - The memory unit consists of primary memory and secondary memory.
 - (i) **Primary Memory** (main memory) of the computer is used to store the data and instructions during execution of the instructions. Random Access Memory (RAM) and Read Only Memory (ROM) are the primary memories.
 - (ii) **Secondary Memory** (Auxiliary memory) is non-volatile and is used for permanent storage of data and programs. Magnetic tape, disks are the examples of secondary storage.
- 4. Output Unit:**
- The result of computer processing is called as output.
 - This result is communicated to user through a devices called output devices such as monitor, plotter, printer etc.
 - Functions of output unit are listed below:
 - (i) Output unit accepts the produced results, which are in the coded form.
 - (ii) It converts these coded results to human acceptable form.
 - (iii) Output unit supplies the converted results to outside world.

1.1.5 Generations of Computers

- Evolution of modern computer is commonly considered in terms of generations of computers.
- Each new generation has made the changes in computer characteristics such as increase in speed, increase in storage capacity, increase in reliability, reduction in system cost, decreasing in size, etc.
- According to the technology used, there are five generations of computers, which are discussed below:

1. First Generation Computers (1942-1955):

- The first generation computers were using vacuum tubes and machine languages were used for giving instructions.
- The computers of this generation were very large in size and their programming was a difficult task.
- The first commercial electronic digital computer capable of using stored programs was called "Universal Automatic Calculator" (UNIVAC) built by Macuchy and Eckert in 1951.
- The major first generation computers are UNIVAC-1, IBM-701, IBM-650, ENIAC (Electronic Numerical Integrator And Calculator), EDVAC (Electronic Discrete Variable Automatic Computer), EDSAC (Electronic Delay Storage Automatic Calculator), etc.



(a) Vacuum Tube



(b) 1st Generation Computer

Fig. 1.3

Advantages	Disadvantages
(i) First generation computers were fastest calculating devices of their time. (ii) They support parallel processing.	(i) Bulky in size (required large rooms) and time consuming for assembly and installation. (ii) Vacuum tube required very high power consumption.

2. Second Generation Computers (1955-1964):

- Computers are entered into second generation by the introduction of transistors. Vacuum tubes were replaced by tiny solid-state components called as transistors.
- Transistors were highly reliable, requires less power and faster than vacuum tubes.
- High Level Languages such as FORTRAN, COBOL, BASIC etc. were introduced. The practice of writing programs in machine languages were replaced by high level languages.
- Punched cards were used for input-output operations.
- Major second generation computers were IBM-1400 series, IBM-7000 series, Honeywell 200, CDC 3600, UNIVAC 1108 etc.



(a) Transistors



(b) 2nd Generation Computer

Fig. 1.4

Advantages	Disadvantages
(i) Transistors are faster and more reliable than vacuum tubes. (ii) Cheaper in cost and less power consumption also smaller in size.	(i) Time consuming for assembly and installation. (ii) Maintenance is high. (iii) Difficult and costly for commercial production.

3. Third Generation Computers (1964-1975):

- The third generation computers used the new technology i.e., Integrated Circuits (ICs) in place of transistors.
- All electronic components like transistors, resistors and capacitors were fabricated on silicon chips i.e., ICs.
- IC has higher speed, larger storage capacity and smaller size.
- Operating systems were introduced for use in computers. Significant advances in hardware technology made the introduction of keyboards and monitors for data input and output. More high level languages like Pascal, RPG were also introduced in the generation.
- Major third generation computers were PDP-8, PDP-11, IBM-360 series, ICL -2900 series, CDC's CYBER -175, TDC-316, IBM 370/168 etc.



(a) IC's



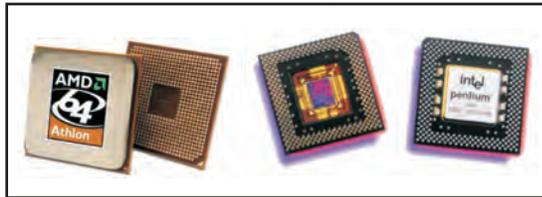
(b) 3rd Generation Computer

Fig. 1.5

Advantages	Disadvantages
(i) Required small space (portable). (ii) More reliable and faster in speed. (iii) Support high level languages. (iv) Installation is required in less time.	(i) Cost is more than fourth generation computers. (ii) Highly sophisticated technology required for the manufacturing chips.

4. Fourth Generation Computers (1975-1989):

- The ICs used in third generation computers had about 10 to 100 transistors per unit. This technology was called Small-Scale Integration (SSI).
- Later, with the advancement of technology for manufacturing ICs, it is possible to integrate 10,000 transistors in an IC. This technology is called Large-Scale Integration (LSI).
- Very Large Scale Integration (VLSI) can pack a million or more transistors on a single chip. LSI and VLSI technologies led to the introduction of Microprocessors.
- Computers which are designed using Microprocessors become the fourth generation computers.
- Intel introduced the first microprocessor 4004 using LSI. The languages C, LISP, Prolog become popular in this generation.
- Major fourth generation computers are APPLE II, IBM 4341, DEC 10, IBM System 370, CRAY-MPC, WIPRO 860, IBM AS/400/B60, IBM ps/2 MODEL 80, HCL Magnum, etc.



(a) Microprocessor



(b) 4th Generation Computers

Fig. 1.6

Advantages	Disadvantages
(i) Portable in size and easy for installation. (ii) Cheaper in cost and more reliable. (iii) Supports high level language and networking.	(i) Expensive. (ii) Single user oriented.

5. Fifth Generation Computers (1989 onwards):

- In the fifth generation, the VLSI technology became ULSI (Ultra Large Scale Integration) technology, resulting in the production of microprocessor chips having ten million electronic components.
- Fifth generation is based on parallel processing hardware and AI (Artificial Intelligence) software.
- AI is an emerging branch in computer science, which interprets means and method of making computers think like human beings. All the high-level languages like C and C++, Java, .Net etc., are used in this generation.
- Quantum computation and molecular and nanotechnology will be used. So we can say that the fifth generation computers will have the power of human intelligence.
- Some computer types of fifth generation are UltraBook and ChromeBook.



Fig. 1.7: 5th Generation Computer

Advantages	Disadvantages
(i) Very less power is required. (ii) More smaller and handy than computers of fourth generation computers. (iii) Faster in speed and more reliable.	(i) AI and the overall advanced technology. So, it requires a powerful learning curve. (ii) They tend to be sophisticated and complex tools.

1.1.6 Advantages and Disadvantages of Computers

Advantages of the Computers:

- Speed:** When data, instructions, and information flow along electronic circuits in a computer, they travel at incredibly fast speeds. Many computers process billions or trillions of operations in a single second.
- Reliability:** The electronic components in modern computers are dependable and reliable because they rarely break or fail.
- Consistency:** Given the same input and processes, a computer will produce the same results consistently.
- Storage:** A computer can transfer data quickly from storage to memory, process it, and then store it again for future use. Many computers store enormous amounts of data and make this data available for processing anytime it is needed.
- Communications:** Most computers today can communicate with other computers, often wirelessly.

Disadvantages of the Computers:

- Health Risks:** Prolonged or improper computer use can lead to injuries or disorders of the hands, wrists, elbows, eyes, neck, and back.
- Impact on Environment:** Computer manufacturing processes and computer waste are depleting natural resources and polluting the environment.
- Public Safety:** Adults, teens, and children around the world are using computers to share publicly their photos, videos, journals, music, and other personal information. Some of these unsuspecting, innocent computer users have fallen victim to crimes committed by dangerous strangers.
- Impact on Labor Force:** Although computers have improved productivity in many ways and created an entire industry with hundreds of thousands of new jobs, the skills of millions of employees have been replaced by computers.
- Violation of Privacy:** Nearly every life event is stored in a computer somewhere like in medical records, credit reports, tax records, etc. In many instances, where personal and confidential records were not protected properly, individuals have found their privacy violated and identities stolen.

1.2 TYPES OF COMPUTER

- Computers can be classified according to purpose, data handling and functionality as shown in Fig. 1.8.

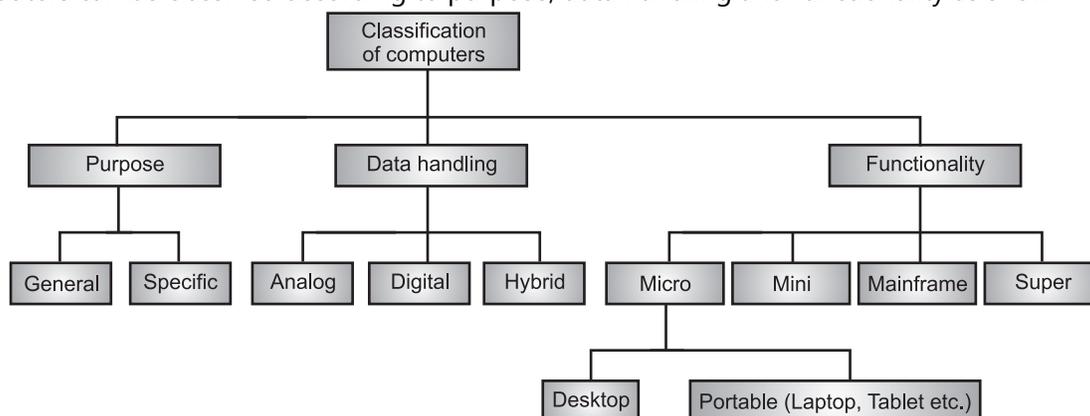


Fig. 1.8: Types or Classification of Computers

(A) Types of Computers According to Type of Data Handling Techniques: Different types of computers process the data in a different manner. According to the basic data handling principle, computers can be classified into three categories i.e., analog, digital and hybrid as discussed below:

1. Analog Computers:

- A computing machine that works on the principle of measuring, in which the measurements obtained are translated into desired data (information) is known as analog computer.

- Modern analog computers usually employ electrical parameters, like pressures, voltages, resistances or currents, temperatures, to represent the quantities being manipulated.
- The earliest computers were analog computers.
- Analog computers are used for scientific and engineering purposes. Slide rule, Antikythera mechanism, astrolabe, differential analyzer, Deltar, Kerrison Predictor are the examples of analog computers.

Advantages	Disadvantages
(i) They provides continuous representation of all data. (ii) They are faster in speed and inexpensive.	(i) Analog computers are not accurate. (ii) Analog computers has lack memory.

2. Digital Computers:

- A computer that operates with information, numerical or otherwise, represented in a digital form (0's an 1's) is known as digital computer.
- Digital computers process data including text, sound, graphics and video into a digital value in 0's and 1's.
- The desktop PC at home, banks, offices etc., are the examples of digital computers.

Advantages	Disadvantages
(i) Digital computers are accurate. (ii) They can store large amount of data.	(i) Digital computers are slower than analog computers. (ii) They have higher cost and complexity.

3. Hybrid Computers:

- Those computers which employ both the features of analog and digital computers are known as hybrid computer.
- EAI 180, HPLC and EAI 185 are the examples of hybrid computers.

Advantages	Disadvantages
(i) Less expensive than the digital computer. (ii) Hybrid computers have tremendous computing speed.	(i) Hybrid computers required detailed knowledge of operation for both the analog and digital computers. (ii) Simulations using hybrid computers were extremely time consuming.

- Following table compares analog, digital and hybrid computers:

Sr. No.	Analog Computer	Digital Computer	Hybrid Computer
1.	Analog computers are used to process analog data.	Digital computers are used to process digital (letters, numerals, special symbols) data.	A hybrid computer can process both digital and analog data.
2.	Speed is a faster than digital computer.	Speed is slower than hybrid computer and to analog computer.	It has high speed than digital and analog computers.
3.	Analog computer do not requires any storage capability because they measure quantities in a single operation.	Digital computers requires storage capability.	Hybrid computer requires storage capability.
4.	Data in analog computer is of continuous in nature.	Data in digital computer is discrete in nature.	Hybrid computer process both continuous and discrete data.
5.	Analog computer can process only numeric data.	Digital computer process numeric as well as non-numeric data.	It process both numeric and non-numeric data.
6.	Examples: (i) Slide rule (ii) Astrolabe	Examples: (i) Desktop PC (ii) UltraBook	Examples: (i) HPLC (ii) EAI 180